

SUPPORT FOR THE AMENDMENTS

The amendment to Claim 1 is supported by the specification, particularly at page 7, lines 11-13. Accordingly, no new matter is believed to have been added to the present application by the amendments submitted above.

REMARKS

Claims 1-7 remain pending. Favorable reconsideration is respectfully requested.

The present invention relates to an optical information medium. An important feature of the claimed medium is that the light transmission layer is a cured substance of an active energy ray-curable composition containing a urethane di(meth)acrylate compound (A) of the formula (I) and a urethane di(meth)acrylate compound (B) synthesized from an isocyanate compound, poly-hydric alcohol and hydroxyl group-containing (meth)acrylate. In addition, the cured substance has a specified tensile elastic modulus and light transmittance properties. See Claim 1.

The rejections of the claims under 35 U.S.C. §103(a) over Ikenaga et al. in view of Hegel, Yukiyasu et al., Brown et al., Hara et al. and Yukumoto et al. are respectfully traversed. The cited references fail to suggest the claimed optical information medium.

Ikenaga et al. describe an optical disk. See the Abstract. The reference fails to disclose or suggest an optical information medium comprising a light transmission layer which is a cured substance of an active energy ray-curable composition containing the specific urethane di(meth)acrylate compound (A) and the specific urethane di(meth)acrylate compound (B).

Hegel discloses polyfunctional urethane (meth)acrylate compounds. However, the polyfunctional urethane (meth)acrylate compounds are the 6-functional urethane acrylate prepared from isophoronediiisocyanate and pentaerythritol triacrylate (Example 1), the 6-functional urethane acrylate prepared from hexamethylene diisocyanate and pentaerythritol triacrylate (Example 2), the polyfunctional urethane methacrylate prepared from Lexorez 5171-280 [polyester polyols having a hydroxyl functionality 5-7; column 8, lines 53-57] and 2-isocyanatoethyl methacrylate (Example 3-8), and the 2-functional urethane methacrylate prepared from 1,6-hexanediol and 2-isocyanatoethyl methacrylate (Example 9). In contrast,

the di(meth)acrylate compounds (A) and (B) [2-functional urethane (meth)acrylates] in the present invention are clearly different from the 5 or more-functional urethane (meth)acrylate compounds disclosed in Example 1 to 8 of Hegel. The urethane methacrylate in Example 9 of Hegel is a 2-functional compound. However, it was prepared from 1,6-hexanediol and 2-isocyanateoethyl methacrylate. Consequently, it is clearly different from the di(meth)acrylate compounds (A) and (B) in the present invention. In conclusion, Hegel does not suggest the di(meth)acrylate compound (A) nor (B) in the present invention. Furthermore, Hegel does not suggest the combination of the compounds (A) and (B).

Yukiyasu et al. disclose a urethane acrylate compound prepared from three compounds: an isocyanate compound, a specific glycol compound and an ethylenically unsaturated compound having a hydroxyl group. That corresponds to the di(meth)acrylate compound (B), but not the di(meth)acrylate compound (A) in the present invention. In order to prepare the di(meth)acrylate compound (A), a glycol compound is not used. In other words, the di(meth)acrylate (A) does not contain any glycol compound structure. Consequently, Yukiyasu et al. do not suggest the di(meth)acrylate compound (A).

Yukiyasu et al. disclose Preparation Examples for urethane acrylate using both of polyoxytetramethyleneglycol and polyethyleneglycol (Preparation Examples 1 and 2), by using both of polyoxytetramethyleneglycol and polyoxy ethyleneglycol polypropylene alkylether type glycol compound (Preparation Example 3), or by using polyoxytetramethyleneglycol (Preparation Examples 4 and 5). In all of the Preparation Examples, a glycol compound was used for preparation of urethane acrylate. Consequently, Yukiyasu et al. do not suggest the di(meth)acrylate compound (A). Yukiyasu et al. disclose the combination of urethane acrylate compounds containing a glycol compound structure. However, Yukiyasu et al. do not suggest the combination of the di(meth)acrylate compound

(A) containing no glycol compound structure and the di(meth)acrylate compound (B) containing a glycol compound structure.

Yukiyasu et al. disclose that the composition contains (a1) and (a2) where the ratio $(a2)/(a1) \leq 2.5$. However, the ratio $(a2)/(a1)$ is, for example, a ratio of isophorone diisocyanate and tolylene diisocyanate as raw materials for the urethane acrylate in Preparation Example 2. Consequently, the ratio $(a2)/(a1)$ has not concern with the ratio of the di(meth)acrylate compound (A) containing no glycol compound structure and the di(meth)acrylate compound (B) containing a glycol compound structure.

Regarding the abstracts cited by the Examiner, the compounds referred as CRN was prepared from not only isophorone diisocyanate and 2-hydroxyethyl acrylate but also a glycol compound as disclosed by Yukiyasu et al. Consequently, the compounds are different from the di(meth)acrylate compound (A) specified in Claim 1.

Furthermore, the Examiner cites the tensile strength of 60 kg/cm^2 in the Examples of Yukiyasu et al. However, 60 kg/cm^2 corresponds to 6 Mpa. Consequently, the tensile strength of 6 Mpa is entirely different from the tensile elastic modulus (600 MP to 1300 Mpa) of the cured substance (the light transmission layer) in the present invention.

Mr. Juichi Fujimoto, one of the inventors of the present invention, carried out experiments in order to make sure that the urethane acrylate in Preparation Examples 1 and 2 of Yukiyasu et al. does not show good tensile elastic modulus nor provide good protective ability. The results of those experiments are presented in the Declaration submitted herewith.¹

¹ The Declaration is submitted in unexecuted form. The executed Declaration will be submitted shortly.

Brown et al. disclose a urethane acrylate compound on page 8, which is prepared from 6 mole of 4,4'-methylene bisphenyl isocyanate, 5 mole of polytetra methylene glycol and 2 mole of e-hydroxyethyl acrylate. This compound corresponds to the di(meth)acrylate compound (B) in the present invention. Furthermore, Brown et al. disclose another urethane acrylate compound on page 8, which is 2-isophorone diisocyanate trimer-2-hydroxyethyl acrylate adduct. This 3-functional compound is different from the di(meth)acrylate compound (A) in the present invention. Consequently, Brown et al. do not suggest the di(meth)acrylate compound (A). Furthermore, Brown et al. do not suggest the combination of the di(meth)acrylate compounds (A) and (B).

Hara et al. disclose a compound in Synthesis Example 9. However, the compound is a 3-functional compound prepared by reacting a hexamethylene diisocyanate subjected to isocyanurate modification with a polycaprolactone-modified hydroxyethyl acrylate. Consequently, Hara et al. do not suggest the di(meth)acrylate compound (A). Furthermore, Hara et al. do not suggest the combination of the di(meth)acrylate compounds (A) and (B).

In conclusion, considering the cited references in combination, it would not have been obvious for ordinary skilled persons to combine the di(meth)acrylate compounds (A) and (B). The light transmission layer in the present invention has the specific tensile elastic modulus. As a result, the claimed optical information medium shows an excellent effect in a balance between the warpage of optical information medium and a hardness of light transmission layer. Consequently, the layer is very useful as a light transmission layer of optical information medium.

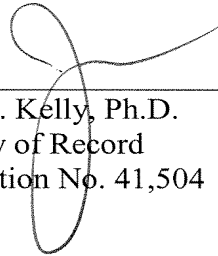
In view of the foregoing, Claims 1-7 are not obvious over the cited references. Accordingly, withdrawal of this ground of rejection is respectfully requested.

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Applicants submit that the present application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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